

Popular urban settlements in Guatemala:  
GUIDELINES FOR PHYSICAL DEVELOPMENT

by

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ABSTRACT

This work gives some guidelines for the definition of norms for land utilization, circulation, and land subdivision so that urban regulations may be formulated that will allow flexibility in the development of popular urban settlements in Guatemala.

The work is directed to the entities concerned with development of these settlements in Guatemala, in particular to the National Bank for Housing of Guatemala (BANVI).

The study was based on an evaluation of settlement cases in Guatemala City, on an analysis of the urban regulations in force there, and on an evaluation of the appropriateness of the technology involved in the development of these urban areas in the context of application of the norms.

The concepts of Land Utilization and Circulation are taken from the book Urbanization Primer by Horacio Caminos and Reinhard Goethert (Cambridge, Mass.: The M.I.T. Press, 1978). The criteria of norms based upon the utilization of the land and systems of circulation were developed in the Urban Settlement Design Program in 1975, under Horacio Caminos and Reinhard Goethert.

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Cover: La Limonada, a squatter settlement in zone 5 of Guatemala City. On the back is the Civic Center.

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# CONTENTS

ACKNOWLEDGMENTS	4
PREFACE	6
INTRODUCTION	8
A. CRITERIA FOR DEFINING NORMS FOR PHYSICAL DEVELOPMENT	12
A.1 THE "LAND-USE" CRITERIA	13
Definition, analysis, the criteria in Guatemala	
A.2 THE "LAND-UTILIZATION" CRITERIA	18
Definition, analysis, the criteria in Guatemala	
A.3 CONCLUSION	21
B. AN OUTLINE FOR NORMS FOR PHYSICAL DEVELOPMENT	23
B.1 THE GENERAL SUBJECTS	23
B.2 THE SPECIFIC CONTENTS	24
B.2.1 LAND UTILIZATION	
Conditions for the land to be utilized;	
land utilization types; public and semipublic	
areas; semiprivate and private areas	
B.2.2 CIRCULATION	
Street types and relationships; street inter-	
sections; relationship of streets to other	
elements; additional components used for	
circulation; circulation system and storm	
drainage	
B.2.3 LAND SUBDIVISION	
Blocks and groups of lots; semiprivate and	
private lots	
B.3 THE NECESSARY COMPLEMENTS	45
Scope, applicability, administration, definitions	
NOTES	49
ABBREVIATIONS	50
EQUIVALENTS	50
GLOSSARY	51
BIBLIOGRAPHY	54

## PREFACE

### Background

One of the negative facts of modern urban areas of the world is that great percentages of their population do not have access to the advantages and facilities that are usually associated with urban life. Cities are becoming larger and denser, but their living conditions are deteriorating faster and faster.

Most people in Latin American countries live within urban areas but lack public services and utilities. And most of them are blocked from a better way of life, because the system denies them opportunities for improvement.

In Guatemala the situation is no different. Guatemala has a growing population that looks to the urban areas of the country as the best places to live. Consequently, at present almost one-sixth (1.1 million) of the total population of 6.8 million of Guatemalans live in the capital and largest city, Guatemala City. And since this urban area lacks the conditions to accommodate such a large number of people, it is surrounded by squatters and slums set up mainly on the slopes of the ravines at its edges.

An analysis of the causes of this problem leads one to the conclusion that its roots are in Guatemala's economic and social system. But there are also other important factors that converge to determine certain aspects of the problem: one, a factor that limits development of existing settlements; the other, a factor that limits financial sources for new housing and settlement programs.

The first specific factor stems from Guatemala's urban regulations. Many areas of Guatemala's cities are officially nonexistent or illegal because current cities'

by-laws and regulations encourage development of urban conditions that the urban poor cannot afford. Therefore, when a settlement is developed to satisfy the demand of the majority of the population (the urban poor), its physical features do not comply with those municipal criteria. And as a consequence, such a settlement is not served by its municipality, to the detriment of the living conditions of its inhabitants.

The second factor is related to investments made in popular housing programs. Great amounts of resources and financing are inefficiently used because of the arbitrariness characteristic of urban designs and plans, which are full of "practices and procedures of urban development [that] are wasteful of land and services on a very large scale."<sup>1</sup> The consequences of this may be seen when future programs or loans are being appraised. Then, because there is no suitable normative instrument to serve as a guarantee or as a reference for how the money will be invested, and with the bad example some settlements set with their inadequate and wasteful practices, those programs or loans are restricted or limited.

In order to cope with the limitations caused by these two factors, some institutions concerned with urban development in Guatemala have considered it necessary to define a set of norms that deal with the physical conditions of popular urban settlements. Specifically, the National Bank for Housing (BANVI), the main governmental agency for housing, has promoted the study of those new regulations and has interested other institutions in their analysis and eventual promulgation.

As a response to those initiatives, this work gives some general guidelines for the definition of those norms in three aspects of the physical development of popular urban

settlements: land utilization, circulation, and land subdivision.

## Objectives and targets

**OBJECTIVES:** The objectives that have been proposed for the work are the following:

Specific objective: to provide guidelines for the definition of norms for land utilization, circulation, and land subdivision, in order to formulate urban regulations that allow flexibility in the development of popular urban settlements in Guatemala.

General objective: to contribute to the reduction of economic and social costs associated with the urbanization process of popular settlements, as a way of facilitating their inhabitants' access to the advantages of urban living.

**TARGETS:** Through defining the norms, it is hoped to achieve specifically the following:

- a) To secure official acknowledgment of existing settlements in order to guarantee institutional support for their development.
- b) To establish a normative base that will ensure that the development of new settlements will be regulated, and at the same time that that base will become a guarantee for the negotiation of financing for future housing programs.

## Audience

The work will be directed to the people concerned with the development of popular urban settlements in Guatemala, who will use it for the definition of the new norms.

## Data

The data are derived from an analysis of the urban regulations that are in force in Guatemala, from field research

carried out by the author in popular settlements in Guatemala City, and from the evaluation of different technical information about physical development of urban areas.

The Guatemala City settlements that were studied included

- a) spontaneous formations: Colonia Niño Dormido and Colonia 4 de Febrero in zone 7 and La Limonada in zone 5;
- b) semispontaneous developments: Colonia Maya in zone 18; and c) planned settlements: La Alameda and El Paraíso I in zone 18.

The work was done, consequently, based on data that served to identify the problem and on data that were used to arrive at an appropriate technical solution of it.

## Framework

Since norms are generally understood as "measures of levels of acceptability, at a given time and place and in a given set of cultural, technological and economic conditions,"<sup>2</sup> this work shares that limitation: its frame of reference is relative rather than completely objective or absolute, dynamic rather than fixed, as a response to the proposed objectives and targets.

## Contents

The work is divided into three main sections:

### INTRODUCTION

An evaluation of why the norms or physical regulations are necessary and how they are related to the different settlement development cases in Guatemala.

### A. CRITERIA FOR DEFINING NORMS FOR PHYSICAL DEVELOPMENT

An analysis of the line that has to be followed to define the norms, in terms of the subjects that ought to receive the main emphases. The conclusion of this section is that

land utilization and circulation should be the two primary reference subjects.

#### B. AN OUTLINE FOR NORMS FOR PHYSICAL DEVELOPMENT

A presentation of the different sections that the norms should include, with specific comments on the contents of each section. The proposal is based on the definition of three basic sections, covering aspects of land utilization, circulation, and land subdivision, respectively; and a complementary section, dealing with aspects related to the application of the norms within the context where they will be used.

Definitions of terms can be found in the Glossary.

## INTRODUCTION

This work proposes some guidelines for the definition of physical norms for popular urban settlements in Guatemala, because it is believed that regulations are needed to ensure better conditions in the development of such urban areas. The reasons why those norms may serve those purposes can be understood by analyzing some aspects of the settlement development cases common in Guatemala and by studying their limitations and the possibility of improving them.

### The settlement development cases in Guatemala

The different settlement development cases in Guatemala may be identified basically as a function of their developers, which are of three types: popular, public and private. The cases, therefore, have been classified into three groups, according to the following descriptions and the information given in Table I:

#### A. POPULAR DEVELOPER CASES

These settlements are established by marginal sectors of the population, generally for self-use but sometimes for profit. The formations include spontaneous occupations of private or publicly owned land (squatters) and arbitrary and empirical developments of private land. There is no formal financing in these cases.

The settlements do not comply with urban regulations. Examples: Old and new squatter settlements like La Limonada and Colonia Niño Dormido in zones 5 and 7, respectively; "Clandestine" settlements like Colonia San Martín de Porres in zone 7.

#### B. PUBLIC DEVELOPER CASES

These settlements include housing projects sponsored



for service by public institutions and nonprofit organizations (including cooperative associations) financed through the public sector. These settlements are directed to middle- and low-income populations.

When the project is for middle-income people the settlement plan usually follows municipal regulations; but when the program is for low-income populations, other, nonmunicipal criteria are used.

The developer always has legal right to the site.

Examples: Regular and special BANVI projects, such as Colonia Bello Horizonte in zone 21 and Colonia El Paraíso I in zone 18.

### C. PRIVATE DEVELOPER CASES

These settlements are promoted and financed by the private sector, for profit, and intended for high-, high-middle-, and middle-income people.

The settlement plan complies with municipal regulations when the project is for high-middle- and high-income populations, but when it is for middle-income people, not all regulations are followed.

The developer always has legal right to the property.

Examples: Regular and suburban private projects such as Colonia Jardines de Utatlán II and Planes del Frutal, in zone 11 and Villalobos, respectively.

DEVELOPER TYPE		FINANCIAL SOURCE	GENERAL PURPOSE	DEVELOPMENT CASE	USER INCOME GROUP	SPECIFIC PURPOSE	ORIGINAL PRODUCT			TENURE OF SITE LAND	EXAMPLE OF SETTLEMENTS
							LOT*	URBAN INFRA-STRUCTURE & SERVICES	SHELTER		
A	POPULAR	--	self-use, profit	A.1	low; very low	self-use, (profit)	minimum or less	none or incomplete	none	illegal	Niño Dormido
				A.2	mostly low	profit	mostly minimum	incomplete or none	none	legal	San Martín de Porres
B	PUBLIC	public sector	service	B.1	low	service	minimum	minimum	none or one room	legal	El Paraíso I
				B.2	middle	service	standard or intermediate	standard	standard	legal	Bello Horizonte
C	PRIVATE	private sector	profit	C.1	middle	profit	standard	incomplete	none	legal	Planes del Frutal
				C.2	high; high middle	profit	standard	standard or luxury	standard or luxury	legal	Jardines de Utatlán II

\*with exception of multifamily buildings or condominiums

TABLE I  
CURRENT SETTLEMENT DEVELOPERS AND DEVELOPMENT CASES

Of the development cases that have been identified, some are intended for the majority of the population. These include settlements established by popular developers and settlements sponsored by public developers, both characterized by the provision of minimum physical conditions: cases A.1, A.2, and B.1 in the table. These cases, commonly developed without compliance with urban regulations, constitute the different options that the urban poor have available for living space.

For the lower income levels of the urban population, there are a few good things about the existence of these three cases, and that is that they supply at least some options to satisfy these people's demand for land. In addition to that, in case B.1 the users have the guarantee that the settlements will be stable and permanent, since public developers usually ensure that they will be. Also in case B.1, the city and the public sector have the advantage that they may have control over the growth of those areas and may include them in their plans of urban development and provision of infrastructure and services.

However, the three cases also present some negative aspects. In all of them the settlement plans are usually wasteful of land and resources, a condition that works against the users themselves and against the city and the public sector also, for two reasons. First, because the settlements become more expensive and the land becomes scarce; and second, because maintenance of those areas demands disproportionally high costs. And in popular developer cases, settlements usually lack essential services and infrastructure, presenting difficult conditions for their users and for the urban population in general in aspects of health and safety. Also in popular developer cases, the inhabitants know the settlements may not

be permanent and therefore do not take pride in maintaining and improving their respective areas. And, finally, as none of the three cases complies with municipal regulations, the municipalities offer them incomplete or no services.

The reasons for the existence of the popular developer cases, as well as the reasons why the municipal regulations are not completely complied with in case B.1, stem from the basic characteristics of those regulations. The urban poor cannot afford housing that complies with standard municipal regulations because the regulations demand investments they cannot make. Furthermore, as these regulations are usually long, complicated, and difficult to enforce and carry out, there is a natural resistance to compliance with them.

Since the negative aspects of these three cases spring from the ways the settlements are being developed and not from the developers themselves, better conditions can be guaranteed in those settlements by regulating the processes by which they are developed. Specific regulations can be formulated suitable for guiding such development.

Application of those regulations or norms would mean that some changes would take place in the settlement development cases that have been identified. Indeed, it is expected that the consequences of the application of the norms would be the following:

- a) The settlement supply currently related to cases A.1, A.2, and B.1 would tend to adopt new expressions, characterized by the provision of regulated minimum conditions on lots, urban infrastructure, and services.

- b) The settlements developed in case B.1 would offer better conditions to more people, because the new norms would encourage more economical practices in the use of land and resources.
- c) Case A.2 would become similar to modified case B.1. Since the new requirements would be lower and simpler than standard municipal regulations, case A.2 would receive public and financial support. Actually, case A.2 would tend to disappear.
- d) Case A.1 would also tend to disappear, because the supply of accessible and desirable settlements would increase with the modification of cases B.1 and A.2. Existing settlements of case A.1, however, would become, through public support, similar to modified case B.1.
- e) Finally, settlements developed under any of the modified cases would receive official acknowledgment and support, and the provision of municipal services would be guaranteed, because the settlements would be complying with the conditions specified in the new official norms.

All this means that with the application of the norms, popular urban settlements would become better places for living.

Those are the reasons why it is believed that new norms are necessary and that their effects in the development of new urban areas in Guatemala would be positive.

## A. CRITERIA FOR DEFINING NORMS FOR PHYSICAL DEVELOPMENT

Physical regulations for urban areas must be defined with special emphasis given to the subjects that are considered most suitable for use as parameters for evaluating the process of development of those areas. Only in that way can regulations for flexible application and measurable effects be outlined, for only that way will their basic concepts be clearly identified.

Most urban regulations in Latin America tend to cover different subjects without establishing any hierarchy nor relationship among them, and the result is norms or standards with emphases on irrelevant subjects like setbacks, land coverage, and the like.

It is difficult to generalize and say that in all cases the lack of good judgment in the definition of all those regulations can be imputed to the importation of ideas on urban development from other, more industrialized areas like the U.S.A. and Europe.<sup>3</sup> However, we may say that it has been a common practice to try to adapt or copy or average regulations that are used in other realities. And the consequence has been the promulgation of contradictory and unrealistic regulations.

A more adequate way of defining urban regulations that has been used in some cases has been to outline them in two basic subjects: land use and circulation. According to the supporters of this approach, it covers at once the most important aspects of the physical development of urban areas. These supporters believe that by means of land use they may cover general aspects related to the urban land tissue; while with circulation they may cover aspects of the lineal connections and interrelationships among them.

The selection of circulation as one of the main subjects by which we may identify aspects of the urban development pro-

cess seems to be right. However, it is necessary to question whether land use is the most suitable concept to serve as the complement of circulation in the task of defining urban regulations. Does land use take into consideration the most important aspects of the way urban land, as a tissue, serves specific purposes?

The answer is probably negative, because there is a better choice: land utilization instead of land use. And therefore work should be based on criteria of land utilization and circulation as the point of departure.

In any case, to reach a definitive answer to the foregoing questions, it is necessary to analyze the alternatives in relation to the first subject: the land-use and land-utilization criteria.

## A.1 The "land-use" criteria

### DEFINITION

According to the land-use criteria, land may be classified according to the kind of activities for which it is going to serve. Next, it may be classified in arbitrary land-use types such as residential, commercial, recreational, industrial, and so forth.

The land-use criteria focus all their attention on the use of the land, and as a consequence aspects intimately related to the definition of the way the land is used are not within their scope.

### ANALYSIS

The main limitation of the land-use criteria is probably that they are defined without establishing any relationship between land and users but only between land and use. Land tenure types and in general all the conditions related to the ways land is held are left out of these criteria.

In terms of land tenure, particular attention has to be

paid to private ownership. One of the fundamental principles of western economic, political, and cultural systems is private property as an institution. "Private property is guaranteed."<sup>4</sup> And as a consequence, the individual has the right to own and to control and use the owned thing. The most elemental legislation in western systems supports and is supported on that principle. Complementary legislation gives and establishes certain rights to the state and to the public sector to intervene in privately owned property, but the main system of reference is established by the fundamental concept.

Therefore, in western countries urban legislation is begun with one great liability and in the face of a great contradiction: privately owned land.

If the reason why people think about regulations is that they want to guide and promote development in their cities and urban settlements and to assure adequate conditions in them, the first limitation they will meet will be that there are real restrictions affecting the effectiveness of any measure applied over private land. And that fact must be carefully considered in the formulation of any settlement regulations.

When land use has been chosen as a reference for defining regulations, the limitations of private land as an institution have not been taken into account.

The position of the supporters of land-use criteria seems to be that even with the restrictions of private property, land use may be achieved if trust is placed in the land-lords--as if urban development could depend on the goodwill of landowners. And when these supporters are less optimistic, they say simply that those are the tradeoffs of the urban development process.

Within the limitations of the implementation of land-use plans, there is, however, a positive aspect that must be taken into account: the chances of achieving good results are greater with fixing and identifying the "most adequate

uses of the land" in an urban context than if the process were done without that guide. Land use must be considered, in consequence, in its guiding possibilities.

In spite of that, deeper analysis of the land-use criteria will reveal great disadvantages. Because this approach does not consider factors related to the ways the land is used, there is the tendency to plan land uses that cannot be achieved. Sometimes the main reason is that there are discrepancies between the costs of implementation of such plans and the economic situation of the population involved. And in other cases, even when the proposed use is partially followed, urban land deteriorates, because not all the use requirements can be complied with.

As a consequence of those limitations, urban people frequently cannot afford land-use-based plans. And in parallel circumstances, the public sector itself is sometimes unable for economic or administrative reasons, to maintain and guarantee adequate conditions on the land that is of public use.

The situation becomes more negative upon analysis of the results of the application of land-use criteria on popular urban settlements--areas where the urban poor live. Here, the inability of the people to follow or satisfy unrealistic land-use regulations and the neglect of areas of public use that are not maintained by the public sector mean that those sections of cities may not be considered "legal" settlements and may not be provided public services.

Summarizing, the land-use criteria do not seem to be an adequate way to cover all aspects that are important in relation to urban land. But before arriving to a definitive conclusion, it is necessary to see whether the circumstances are the same in the specific case of the application of land-use in Guatemala.

#### THE LAND-USE CRITERIA IN GUATEMALA

The criteria that have been applied in the definition of

urban regulations in Guatemala have been basically a juxtaposition of guidelines inherited from colonial times and land-use criteria that have taken on an official character in the second half of this century. At present, the tendency is to depend on land use for the formulation of most regulations dealing with urban land.

The most elaborate body of urban regulations in Guatemala is the one being used in Guatemala City. Almost all other urban areas of Guatemala follow the lines of action that are applied there. It is not necessary to make a detailed analysis of all the different regulations in force in Guatemala. It is enough to make reference to some of them to corroborate that the general tendency is to depend on land-use criteria.

There are several levels of regulations that deal directly or indirectly with physical urban development, but only in a few cases are there concrete references to urban land issues. At the most specific level, defined by the field of jurisdiction of the municipality as an institution, there are several by-laws, or *reglamentos* covering different aspects.

The tendency of those *reglamentos*, most of which have been promulgated since 1960, follows the land-use criteria that were encouraged by the promulgation in 1956 of the presidential decree Ley Preliminar de Urbanismo.

As a consequence, in Guatemala City the *reglamentos* now in effect--the Reglamento de Construcción and the Reglamento de Localización e Instalación Industrial-- show land-use criteria. And the problems of implementation frequently related to the application of land-use criteria are not unknown here.

As a matter of fact, land-use regulations are repeatedly forgotten and overlooked, because the criteria that have served for their definition have not taken into account the limitations of private property in Guatemala. Private property is an institution in this country, backed by the Gua-



temalan constitution, and in one way or another, urban regulations are subject to it as part of the system.

The contradictions that have resulted from the application of land-use criteria mean that Guatemala City is beginning a process of uncontrollable growth. And some regulations that have been proposed for its control, under land-use criteria, have been rejected by the system even before they could be promulgated, as in the case of the Reglamento del Plan Regulador, a master plan for Guatemala City prepared in 1972 but not presented until a few years later.

In addition to the basic problem of implementation of those instruments, there has been the tendency to make plans that, because of the limitations of land-use criteria, are completely idealistic and unreal. The plans are generally prepared with good intentions and optimism, but under the conception that urban development may be guided without contradictions and based on land-use definitions.

One of the consequences of this thinking is urban regulations directed to only one level of the population: the people that can afford what is traditionally acceptable and desirable living space. The Guatemalan urban poor are, then, almost by definition "illegal" inhabitants, because they cannot afford dwellings which comply with the use requirements specified in these *reglamentos*.

Another consequence is that municipalities are reaching levels of complete incompetence in what they are called to do for the implementation of their own land-use-focused regulations. And as evidence of that, the Municipalidad de Guatemala in the last few years has had great difficulty serving and maintaining the areas of public use of the city. The allocation of land for public use as a result of a unilateral concept based on land-use criteria is showing its effects.

The conclusion is that in Guatemala, as in most Latin American countries, the formulation of urban regulations based on land-use criteria is inappropriate. It fails because of

the inflexibility and narrowness of its focus. It is necessary to look for other criteria. Might it be possible to use the "land-utilization" criteria for those purposes?

## A.2 The "land-utilization" criteria<sup>5</sup>

### DEFINITION

In this case the concept of land utilization serves to qualify the land based on: the individual or shared or community character of its use; on the designation of its responsible agent; and on the relationship that the land keeps with other sections of the settlement or urban area in serving them or being served by them.<sup>6</sup>

Utilization of land is defined based not strictly and only on the use that the land will have, but on other aspects that take into consideration the real circumstances in which it will serve specific purposes.

The concept of land utilization implies four basic types of land:

- a) Public land: This is land for open use by anyone. It is the responsibility of the public sector. It is intended to serve all sections of the settlement or urban area. It is used essentially for unrestricted circulation of pedestrians and vehicles. It commonly includes streets, walkways, and open spaces.
- b) Semipublic land: This is land for open use by the members of the community of a settlement or urban area. It is the responsibility of the public sector and/or the community itself. It is intended to offer services to other areas of the settlement. It is used to provide community services and utilities.
- c) Semiprivate land: This is land for shared use by a specific group of persons. It is the responsibility of that group. It is served by other sections of the settlement, since it receives from them access, services, and utilities. It is used for different activities but basically to complement residential use. Some of its common uses

are restricted circulation and recreation.

- d) Private land: This is land for individual use by a person (and his or her family). It is the responsibility of the users. It is served by other sections of the settlement, since it receives from them access, services and utilities. It is used for residential, commercial, and other activities.<sup>7</sup>

These four land types may be grouped into two categories:

Serving land: public and semipublic land of which the function is to serve semiprivate and private land by offering access, services and utilities.

Served land: Semiprivate and private land which is served by public and semipublic areas and which therefore pays their cost.<sup>8</sup>

The formulation of urban regulations based on land utilization departs from the main inherent principle of these criteria: "Public land should be minimized to maximize semiprivate and private land" while "the semipublic land should be suited to the anticipated population density" and size in order to offer adequate services and an intensive use of the land.<sup>9</sup>

The land-utilization criteria are intimately related to the physical urban layout or design, because the different land types cannot be artificially assigned over just any layout at all. Land has to be in a physical condition suitable to its utilization and the circumstances in which it is going to be used.<sup>10</sup>

## ANALYSIS

In the application of the land-utilization concepts, criteria are found that make it possible to take into consideration the advantages of the land-use alternative. Land uses may be assigned when specific land-utilization types have been defined. And even when in the case of the served land the implementation of those uses may present difficulties, at least those use assignments will serve as guidelines or references.

The land-utilization criteria may be applied in the formulation of urban regulations, since they are based on consideration of the main aspects of how the land is used. And the concept is flexible enough to serve in situations characterized by private property as an institution as well as in other situations. The criteria embody concepts that may be implemented effectively in almost any case.

In contrast to the land-use criteria, this alternative is based on the consideration of all factors that may present difficulties in the implementation of a regulation or plan. Its principle, which reflects its spirit, avoids the proposal of situations that people cannot achieve or afford. And as the percentage of served land is reduced, the possibilities for the public sector to take care of public areas increase.

When these criteria are applied to the development of popular settlements, a more realistic position is assumed than when land use is depended upon. The land can be utilized in a more economical way by increasing the percentage of served land to achieve smaller unit costs. Even the maintenance costs of the public areas will be lower, making it possible for the public sector to take care of them.

Land utilization is in general a guarantee of intensive use of urban land as well as of reduction of areas devoted to the fulfillment of nonbasic or imported needs. The area requirements that are common in car-culture societies may be reduced to the minimum and to a human scale if the land utilization layout is rational and moderate--that is, if the principle is followed.

As a result of the application of these criteria, land serves more uses and at lower costs. Areas that traditionally have been considered open spaces for public circulation, for instance, may become semiprivate land for shared utilization and several other uses in addition to circulation. The use originally given to the land will be complemented by other functions that will give the whole area or settlement a more human and rational scale.

The conclusion after this analysis may be that the land-utilization criteria represent the best approach to formulating urban regulations and plans. However, before arriving at a definitive statement, it should be determined whether these criteria have ever been applied in Guatemala.

#### THE LAND-UTILIZATION CRITERIA IN GUATEMALA

Even when, as has been stated, the common and official tendency in Guatemala is directed to land-use criteria, some manifestations of land-utilization criteria may be found in the history of the urban areas of the country and in spontaneous settlements of current times.

The application of the *Leyes de Indias*, the main urban regulations of colonial times, in the foundations of the two basic kinds of settlements in the country--the *pueblos de indios* and the *villas*--are based on concepts that are similar or parallel to the land-utilization concept and principle. And nowadays, in many squatter areas of Guatemala City, including settlements established both before and after the earthquake of 1976, even without ownership of the land there is a kind of land employment that shares some similarities with the concepts of land utilization.

People naturally tend to occupy the land based on different modalities of land utilization; that is, they tend to give particular uses to the land depending on the definition not only of the activities for which it is going to serve but of how those purposes will be satisfied. And as proof of that, the Guatemalan urban poor show that tendency in their natural manifestations. That is evidence that "the utilization of the land is in the very foundations of any culture".<sup>11</sup>

### A.3 Conclusion

The best criteria that may be followed for the definition of urban regulations are to be based on land utilization and circulation as the two fundamental reference subjects.

These criteria mean more economy, more rationality, and more realism in the identification of the alternatives in urban development than do the land-use and circulation criteria.

Those are the reasons why norms focused on land utilization and circulation will be proposed.

## B. AN OUTLINE FOR NORMS FOR PHYSICAL DEVELOPMENT

### B.1 The general subjects

There are four general subject levels that should be covered in physical urban regulations: land utilization and circulation; land subdivision; infrastructure; and building. The first three levels share the condition that the activities that may be related to them can be achieved only, in most cases, by nonindividuals. The scale of works in those levels is massive, vast, and not within reach of the common and individual inhabitant. These activities demand the collective effort of a community, the public sector, or a corporation. And from that point of view, the conditions that may be formulated in relation to such subjects are of a broader impact than those of the fourth level.

In addition to that, if the importance of those subject levels in relation to how determinant they are in the characterization of an urban area or settlement is evaluated, the first two subject levels must be chosen. Land utilization and circulation, combined with land subdivision, are in fact the most important subjects in the definition of what an urban area is like, because the decision that are made in relation to them tend to bring irreversible and definitive characteristics to that urban context. And in those circumstances, the aspects related to infrastructure, although essential, become complementary and subject to the conditions defined in those first two levels.

Those are the reasons why physical urban regulations must be primarily centralized on land utilization, circulation, and land subdivision. And complementarily, on infrastructure and building.

In this case attention will be focused on the first two subject levels. And therefore the work will be outlined on three basic sections: land utilization, circulation, and

land subdivision. As a complement that is strictly necessary, it will include a section on general aspects intended for the location of the regulations on a specific context. Scope, applicability, administration, and definitions may be the matters to deal with in this case.

## **B.2 The specific contents**

### **B.2.1 LAND UTILIZATION**

Aspects related to the conditions that the land must have in order to be utilized, the identification of the basic land-utilization types, and the general requirements that should be followed in the assignment of those types over a piece of land will be the basic subjects to cover in this section.

#### The conditions for the land to be utilized

To assure that a settlement will be developed in an adequate location, it is necessary to identify basic conditions that should be fulfilled at the scale of the area where the settlement will be located, and at the scale of the site itself.<sup>12</sup>

To fix regulations without taking into account these aspects would mean that settlements could be developed in any place and under any conditions, which is not true.

#### *Site Location*

The location of a site should be suitable to the character and particular conditions in which the settlement has been defined, but in addition to that, there are basic requirements that must always be complied with, because they are essential to the development of the settlements and to the guarantee of the health, safety, convenience, and welfare of the inhabitants.

In general, the location of a site must be adequate to the needs of the people who will live in it. The location must afford convenient access and proximity to suitable sources



of work or employment and to basic services.

In addition to that, aspects related to the accessibility of the site, its geology and soils, its topography, the feasibility of the provision of basic utilities, and the nonexistence of limitations and uses against the proposed purposes of the settlement must also be considered.

#### *Site conditions*

Access to the site has to be guaranteed through a street of public use or through a way that meets the conditions for becoming a public access before the settlement is occupied. The dimensions and additional conditions of this access must be suitable to the settlement and to the size of its population. Another aspect that has to be considered in relation to accessibility is the existence of public means of transportation. There has to be transportation to the closest important city or downtown, and in situations where service has not been provided, there has to be a guarantee that it will be provided by the time the settlement is occupied.

The geological conditions of the site and the area where it is located should have no special tendency to become a hazard or to represent a danger to the community of the settlement. The soil of the areas to be developed in the site must have adequate strengths in relation to the expected or projected building types and structures, even after any earthwork has been done. It also must have suitable chemical characteristics, and its water table should be at an adequate depth.

The topography of the site must be suitable for assigned utilizations and proposed uses of the land, and the plan must consider this factor--even before the land is purchased--because the more difficult the topography, the more expensive will be the project and its execution. Changing the topography must be avoided when its purpose is to flatten the site, because the utilization plan must be adjusted to the conditions of the site, and not the site to the plan.

The provision of basic utilities in the site, in proportion to the population and size of the settlement, must be technically and economically feasible. These utilities should include at least water supply, sewage disposal, storm drainage, electricity, and street lighting. Evaluation of the feasibility of the provision of these services has to be based on the scale of the settlement, but, unfortunately, many sites are purchased without taking this factor into account. And the consequences are that the land cannot be used for the proposed purposes nor with the expected intensity.

Finally, it is not desirable to develop a settlement in an area or a site where there are natural or manmade conditions that are not compatible with the residential purposes of the settlement. Therefore, unsafe or polluted places which can't be fixed before the settlement is occupied should be avoided. And so should industrial areas presenting annoyances and problems to the settlement. Areas with legal restrictions against the proposed uses must be evaluated before the settlement is planned, and the problems must be solved or fitted to the proposed settlement conditions before development is begun.

In general, all the characteristics of the land and each of its limitations have to be evaluated. If those conditions are not studied seriously before the land is purchased or before the plan is prepared the results may be negative for the settlement as a whole and its inhabitants. Unexpected cost increases, caused by the actions taken to cope with the problems of the site, may mean that the settlement will in the end be more expensive than was expected and out of the reach of the people for whom it was originally intended.

#### The identification of the basic land-utilization types

##### *Land-type classification*

To follow the land-utilization criteria directly, it has to be specified that the usable land of the site where a settlement is to be developed will be classified within the four types already identified: public land, semipublic land, semiprivate land, and private land.

For these purposes, usable land will refer to the part of the site that is or could be suitable for specific uses within the settlement and is to be developed as part of the whole settlement. Under this concept, usable land can be controlled and its limits identified, and it can be provided access and basic utilities.

The general idea of establishing a relationship between the basic land types and the usable land is that even if not all of the site can be utilized, as much of it should be utilized as possible. And the usable land should be as large as the conditions of the settlement and the site allow. That is why usable land cannot be defined based on fixed slopes or other arbitrary yardsticks.

In reference to this subject, the classification of the land in the four types means that areas of the site that by tradition would not be considered usable land when the plan is defined may become utilized for specific and important purposes. Areas with medium or medium-high slopes may be assigned, for instance, for semiprivate utilizations and agricultural uses, to satisfy a common need in popular settlements: agricultural land as a complement of residential land.

The general idea, in short, is that the use of the land should be planned in a rational and economical way, compatible with the land-utilization criteria.

And in those terms, to guarantee that the distribution of the usable land to the different utilizations follows those lines, attention must be paid to the percentages corresponding to each land type. The departing point for this should be based on a general consideration of the way those percentages tend to change according to settlement size and densities.<sup>13</sup>

#### *Land-utilization percentages*

If the principle of land utilization is followed, the percentage of public land over the total usable land will remain almost the same even in different settlement scales.<sup>14</sup> Small fluctuations will appear only as a result of topo-

graphical conditions, site shape or proportions, or existing or projected streets in the area. However, the percentage of public land should never be larger than 25% of the usable area.<sup>15</sup>

The percentage of semipublic land will be different for different population sizes. "A small population requires less facilities and consequently less percentage of [semipublic] land. A large population requires more facilities and consequently higher percentage of land. In other words, new facilities are required with increasing levels of population," and more semipublic land is necessary.<sup>16</sup> Then, the percentages of semipublic land will be fixed for each case according to the scale of the settlement, but the principle of economy should not be forgotten, because semipublic areas are serving land, which has a cost that has to be covered with the cost of the served land.

The percentage of served land--private and semiprivate areas--will change in a parallel but inverse way to the semipublic land percentage. If the percentage of land for public utilization is constant, and the percentage of semipublic land increases with population, the percentage of served land, which is the remaining area, diminishes with population.<sup>17</sup> Nevertheless, the percentage for served land should be as high as possible provided that the purposes of the public and semipublic lands are adequately complied with. But adequate measures must be taken in order to avoid problems of overcrowding or overpopulation.

Land utilization percentages should be defined, consequently, after consideration of all the factors that have been mentioned. And they should be fixed based on some basic aims: to distribute the land so as to achieve an intensive employment of it; to guarantee space for a complete provision of community services and facilities; and to make possible an organized community life for the inhabitants, by opening up the alternative of shared utilization spaces.

And to that end, identification will be made of specific ranges of percentages for each land-utilization type, to

serve as general references in the determination of the land utilization intensity given to a site.

#### Public and semipublic areas

Disposition of the public and semipublic areas of the settlement will be defined based on specific conditions, in order to assure that the purposes of these utilizations are been accomplished.

For public areas the conditions will depend on the requirements that have to be complied with to have economical and functional lines of circulation and utilities. For semipublic areas the requirements will be determined by the types of community services that will be provided.

As a general condition, the internal lines of circulation and utilities of the settlement should be located compatibly with the existing or projected lines of the area where the site is located. In all cases it will be required that the circulation network of the settlement be connected to public streets of the municipal or national networks or to public streets linked to them. It is necessary to make specific studies to identify the existing streets, roads, and infrastructure of the area where the site is located; the possibilities for their improvement; and their relationship with other streets being planned, to avoid duplication of expenses, lengthening of construction time, and related problems. For these purposes the municipalities involved, the central agencies of public works and roads, the municipal and private companies for the provision of utilities, and other institutions should be consulted.

*Lines of circulation and  
utilities*

The basic lines of utilities of the settlement must coincide with basic lines of circulation in order to avoid problems in installation and maintenance. In this way, since the basic lines of circulation will be streets that will have adequate conditions for vehicular use, the trucks and vehicles needed for the placement of the infrastructure will be able to enter the areas where they are required.

Location of the basic lines of circulation should be made after consideration of the natural lines of drainage of the site, because if the topography of the site will not be substantially changed such that the lines of drainage will be modified, basic lines of circulation should fit in, coincide with, or go alongside those lines of drainage. This way, draining the site will not mean excessive costs, because advantage will be taken of the topography of the site.

Public land is the best location for lines of utilities. In cases where it is necessary or convenient to place them elsewhere, the most important lines should be placed on semipublic land; the lines serving small sections of the settlement or groups of lots on semipublic or semiprivate land; and the lines at the level of service connections on semiprivate or private land. However, in those cases it will be necessary to establish specific easements that will guarantee the provision and maintenance of the utility or service.

#### *Community services areas*

The semipublic areas of the settlement will be served directly by public lines of circulation, which will be provided access suitable to the uses that are going to be given to each area.

Similarly, these areas will be served by lines of utilities of the settlement in order to guarantee service connections adequate to their respective uses. This may require the basic line serving the area to be equipped with the necessary fittings or elements so that in the future the actual connections or service drop can be completed. In any case, service factors like volume and pressure in water supply, voltage in electricity, projected flow and invert pipe level in sanitary sewerage; and so forth, must be appropriate to the use that the semipublic area will have.

Semipublic land will be provided community services according to the particular conditions, scale, and location of each settlement. However, it will be advisable to define a guide suitable for the determination of the minimum

level of services that should be provided in any case. Only in this way can it be guaranteed to the community and the inhabitant that there will be land for the provision of essential services.

The guide should be prepared taking into consideration that different services are required by populations of different sizes. The larger the population, the more services and semipublic land are required. Therefore, the guide has to serve to determine service requirements at different population sizes, but the definition of the population that is required for the provision of each service should be based on the specification of the area that is needed to have a basic and complete unit of that service. The guide, in relation to this subject, should not be based on "population hierarchies," nor in a simple process of unit area requirements per person, nor in fixed and constant percentages per specific use, which criteria are too rigid or too simple to be fitted to the different requirements of each service. It should be specified that a given service will be provided when the population reaches a certain minimum size or range. And those limits or ranges will be different for each kind of service, because each service has its own requirements and conditions.

In addition to that, the guide should serve to define not only areas but conditions that are required for those areas to serve for a specific service. It is known that for the provision of a service not only an area with a certain size but an area with a whole set of conditions suitable to the proposed use is needed. And in consequence, the guide should emphasize the definition of those conditions.

The services that should be covered in the guide, because they are the essential services that are commonly needed and provided in popular urban settlements, are: primary school; secondary school; sports fields; recreation areas; community center, including a community building, post office, police station, child-care facilities, health center without beds, state-owned pharmacy, public restrooms, and, in some cases, fire station; marketplace; health center

with beds.<sup>18</sup> Nevertheless, other essential services, such as preprimary school, should be provided where feasible. Large settlements, with populations of 36,000 or more, may require additional basic services, such as special schools, hospitals, universities, and so forth.

To determine the conditions required for the provision of each kind of service it will be necessary to study why the service is needed, the ability of the public sector or community to take care of the service, the way the service is normally provided, the characteristics of the population, and the conditions of the urban context. The planning offices of education and health, the municipalities, and the public housing institutions should be consulted to gather specific information and criteria that will serve to define the guide.

#### Semiprivate and private areas

#### *General conditions for served areas*

To define an area as served land we need to be sure that it is going to be provided access, services, utilities, and additional advantages that are supplied by the serving areas. And in addition to that, the basic conditions that have to be complied with to have these areas effectively served must be identified.

Semiprivate and private areas should be served at their lots by public lines of circulation and by the lines of utilities of the settlement.

However, access to a private area may be exclusively through a semiprivate area or lot (which will be called a "court") when both areas are held by the same group of people and their responsible agent is the same. In this case, the lines of utilities serving those private lots may be located on the court. Specific easements will be required in this case, of course, to facilitate those situations.

Utilities will be provided in most cases in individual lot connections. But when the process of development of the settlement includes the upgrading of these utilities and



services, the conditions may be temporarily different: water supply may be provided at a maximum of 100 m from the individual dwellings; sewage disposal should not be farther than that distance; but electricity should be provided in each lot individually.<sup>19</sup> The alternative to providing the services on an individual or a neighborhood basis should be evaluated in each case and should be discussed with the institutions or companies in charge of providing the service.

As private and semiprivate land may be used for nonresidential purposes, specifically for commerce and light industry, it may be necessary to define some conditions to assure that the combination of different uses will be positive. Diversification of uses in served land may be convenient when it represents an intensive land use and provision of services and employment for the inhabitants of the settlement. However, in contrast to the traditional criteria, it is not considered necessary or proper to specify general minimum area requirements for commerce and industry, because those activities demand different percentages of land in different situations.

#### *Nonresidential served areas*

As the original purpose of a residential settlement may be changed by the excessive proliferation of industry and commerce, or sometimes the scarce resources of public housing institutions may favor activities other than housing, it may be necessary to define some limits to avoid the use of excessively high percentages of land for these nonresidential uses. Implementation of these conditions may present some difficulties, but in most cases the specification of lot size and other features may help.

Light industries should be located only in specific areas of the site, based on their characteristics and according to their types. Some industries may be located anywhere within the site, even in residential areas; but others must be located at some distance from residential areas and community buildings. The factors that must be taken into account for classifying an industry by type and specifying the conditions for its location are related to the degree

of pollution, annoyance, and risk connected with the industry in question. In any case, the norms should specify what kinds of industry may be placed within the boundaries of a site, and in what locations.

### *Reserved areas*

A common limitation in the development of settlements is the lack of specification of the purpose or final destination of the reserved areas, areas to be subdivided and utilized after the initial occupation of the settlement.

This lack of specification prevents the whole settlement from being projected as a whole and its elements and areas from being sized and shaped as functions of the general character, utilizations, and uses that the whole will have. And it may mean that those areas are intended for purposes that present no benefit to the community or the settlement.

That is why, in order to avoid those problems, sections or areas of the site to be left as reserved areas should have clearly identified purposes. Specific authorizations should be required for leaving areas of the settlement in this condition. And in addition to that, it may be advisable to require that those areas be legally affected by easements guaranteeing the authorized purposes.

### *Densities*

Finally, to specify a general condition on the served land, it will be necessary to define desirable density ranges as functions of population and lots per unit of area. For these purposes two kinds or indexes will have to be defined: gross density, or ratio of the total population or total number of lots to the total usable area of the settlement; and net density, or ratio of the total population or total number of lots to the total served area. Then there will be four types of density for these purposes: population gross density and population net density; and lot gross density and lot net density.

The density ranges to be defined should be related to conditions of an intensive use of the land within certain limits of acceptability. Their formulation should be based on an analysis of the cost fluctuations associated with low and

very high densities, on the social problems related to overcrowded areas, and on the availability of land for these purposes. Related local tendencies and conditions should be taken into account.

Then, densities should not tend toward the extremely high, but should lead to intensive utilization of the land without problems of overpopulation. Densities lower than 300 people per hectare or higher than 700 should seldom be planned for unless the problems related to them have been solved.

Density ranges should be defined taking into consideration all the factors and particularities of the average population and the urban areas. It should be considered that different densities will be found for different settlement sizes, because of the fluctuations in the demand for semi-public land. And application of density ranges should be based on the particular characteristics of each settlement.

The norms need a density guide to avoid waste of land and resources and related social problems.

### B.2.2 CIRCULATION

In this section the following items will be covered: aspects related to the different street types and the relationships among them; street intersections and the relationship of streets to other elements; conditions for nonstreet components used for circulation; and some considerations of the circulation system in relation to storm drainage.

#### Street types and relationships

In order to understand how the circulation network of a settlement works, its basic street types have to be identified. Streets may be classified in different ways, but the most suitable classification for the purposes of this study is based on the functions that each kind of street fulfills in relation to the settlement and its areas. According to that criterion, streets may be classified in three basic types:

#### *Street type conditions*

external and linking streets; through streets; and access streets.<sup>20</sup>

External streets are those that adjoin the site and serve it and the area where the settlement is located; they are not part of the site itself. Linking streets are those that connect the site to the national or municipal circulation networks of the area where the settlement is located; they are intended for serving the settlement but are not considered a part of its site. Through streets are the main streets of the settlement itself; they serve to interconnect directly and continuously the different areas or sections of it and to uphold its basic lines of utilities; in addition, it is through them that the external or linking streets are connected with the interior of the settlement. Access streets are streets that serve to interconnect through streets to specific areas of the settlement in order to provide access and alternate lines of circulation.

According to the conditions of the settlement and the area where it is located, each street type will have specific use priority by either vehicles or pedestrians. However, the external, the linking, and the through streets will tend to be primarily vehicular, while the access streets will tend to be primarily pedestrian.

The circulation network of the settlement should be designed to guarantee that all areas of it can be reached by vehicles in case of need. However, in cases of difficult topography, short access streets may be left for exclusively pedestrian use, provided that they are short enough and the area they are serving is small enough to avoid accessibility problems.

Streets intended for primarily vehicular use should be provided sidewalks, and streets for primarily pedestrian use should be designed to discourage high-speed vehicles.

Street widths will depend on the uses that the streets are called to serve, but in some circumstances other factors, such as the kinds of equipment that will be employed for the earthworks, may be decisive in the definition of their di-

mensions. As a general rule, however, the external and the linking streets will tend to be wider than the through streets; and these in turn will be wider than the access streets.

A minimum width should be defined for each street type, provided that traveled ways or horizontal clearances be left in all streets to allow circulation of emergency vehicles or of vehicles intended for maintenance of the lines of utilities. In this way sections of the streets may present specific dimensions or conditions as answers to particular requirements, but the minimum widths and horizontal clearances will always be observed. This is why more detailed street conditions do not have to be specified, provided that those minimum conditions are always followed.

The spacing between streets, a function of block size, should be based on technical and economic considerations. Spacing shorter than 80 m requires unnecessary increases in utility and street costs and subsequent high costs in maintenance; while spacing longer than 200 m limits communication among the different areas of the settlement.<sup>21</sup> The uses of the streets in question also have to be taken into account, because streets for vehicular use may be spaced farther apart. In summary, the spacing between parallel streets should be as follows: the distance between two adjacent streets where one or both are primarily pedestrian should be between 80 and 200 m; and the spacing between streets of primarily vehicular use should be between 200 and 800 m. Nevertheless, street spacing should be suitable to the installation requirements of the lines of utilities along the respective streets and to the economy of their placement and maintenance.

#### *Street spacing*

Some guidelines should be given for the use of dead ends--public streets without exits. As dead ends represent certain limitations in accessibility and, when provided with turn-arounds, big areas of public land, they should be avoided whenever possible. However, if it should be necessary to leave a dead end in a specific case, it should be considered under the category of access streets. In this

#### *Dead ends*

case, the length of the dead end would be longer if it were provided a turn-around for vehicles, which is desirable. The length in any case will be a function of the accessibility of emergency vehicles and fire safety regulations. When the dead end has no turn-around it should be no longer than 100 m; when it has a turn-around it should be no longer than 175 m.<sup>22</sup>

#### Street intersections; relationship of streets to other elements

##### *Street intersections*

In relation to the intersections of streets, it should be specified which angles are most desirable to avoid problems in circulation or in the installation of the lines of utilities. Inadequate angles may mean high demand on land, remainder areas of useless shapes, high costs of infrastructure, and permanent inconveniences in the daily life of the settlement.

In general right angles should be used where possible, with the aim of keeping angles a minimum of 60 degrees. But in an intersection where one of the streets is primarily pedestrian the acceptable minimum angle is 30 degrees.<sup>23</sup> This condition should be taken into account also in the case of the intersections of a street with the axis of the main access to a court, a situation where a right angle is best, because repeated use of angles greater or less than 90 degrees in these intersections would mean, at the scale of the whole settlement, high investment costs related to increases in utility connections.

In intersections of streets intended for primarily vehicular use, and mainly in cases of intersections of important lines of circulation, it would be permissible to curve the less important streets before the intersection, in order to improve the angle. But this practice should be avoided in general because curved streets have higher utility costs than straight streets.

And as a general rule, the grade line of the more or most important street should be kept unmodified in street inter-

sections so that that street will have continuity for circulation and drainage purposes.<sup>24</sup>

The relationship that streets will have with the different elements of the settlement should be guaranteed through some specific conditions that have to be identified.

*Relationship of streets  
to other elements*

Open nonstreet public areas, where provided, should be served directly by through streets or by access streets. However, as areas of pedestrian use, they should not be isolated by streets of exclusively vehicular use going along their whole peripheries, because this might restrict their use.

The relationship of levels between streets and served areas should guarantee that access to those areas is adequate and that those areas drain onto the streets. Therefore, streets serving courts directly should be at the same level or at a maximum of 0.15 m lower than the point of main access to them; while streets serving private or semiprivate noncourt lots directly should be at the same level or at a maximum of 1.25 m lower than the point of access of the lots. If there is more than one street meeting a lot, these conditions will be required on only one of the streets.

One aspect that should be taken into account in the street layout is the relationship between streets of the settlement and private land adjacent to the site. The ends of streets should not touch private land that is not part of the site, unless it is necessary to satisfy preestablished rights-of-way. This condition is intended to avoid urbanization of adjacent sites derived from the continuation of secondary streets of the settlement onto those sites. What happens when streets are left this way is that the streets, the services, and the utilities of the settlement are used by other populations and other communities, commonly representing overuse and deterioration of them, and even loss of identification between the people and their settlement.

*Lot courts*Additional components used for circulation

In relation to the criteria of land utilization, there is an important component that is of semiprivate utilization and is used for circulation: the lot court.

Courts should be sized according to the uses that they are going to serve; but some additional factors, such as the kind of equipment that will be used for the earthworks, may become determinant in the definition of their dimensions.

However, court widths should never be narrower than 4 m; this is the minimum dimension which will guarantee that emergency vehicles or utility maintenance trucks may enter the court if necessary and the minimum width to provide adequate light and ventilation to the lots served. Accordingly, the entrance to a court should have a minimum clearance of 3 m.

Residential court should have a minimum width of 6 m when they serve, among other uses, as playgrounds. And their lengths should be based on the number of lots and the population they may serve.

The difference of levels between courts and the points of access to the served lots should be no more than 1.25 m, with the lots always higher or at the same level than the courts, to assure that the lots drain onto the court, and to have acceptable conditions of accessibility to each lot.

In order to have useful courts it will be necessary to provide them with adequate slopes. In general they should be flat, with slopes in the range of 1.5% to 5% intended for draining purposes. But in cases of difficult topography, the possibility should be considered of leaving courts with their surfaces arranged in flat terraces of adequate and useful lengths, slopes between 1.5% and 5%, and a maximum difference of 1.25 m between levels, joined by connecting steps. The maximum court length in these cases would naturally be limited and shorter than the maximum length to be left in flat courts.



### Circulation system and storm drainage

The circulation network of the settlement should provide drainage for rainwater and should avoid flooding, erosion, and other natural hazards of the served area. That is one of the most important purposes of this network.

Accordingly, streets should have adequate longitudinal slopes, suitable wearing surfaces or treatments, and complementary systems for drainage.

The longitudinal slopes on streets should be defined as a function of the use that they are going to serve from the point of view of circulation, of their lengths, and of the wearing protection that they are provided. Streets intended for exclusively pedestrian use may be steeper, if their lengths are limited, than streets that will be used by vehicles; and they may be provided with steps.

Streets should be provided a wearing surface adequate for circulation and drainage and intended for the minimization of erosion, dust, mud, and maintenance.<sup>25</sup> The quality of this surface should be directly proportional to the longitudinal slope of the street and to the intensity of its vehicular use. The surface may cover the entire width of narrow streets, in order to have them working as shallow ditches for drainage. Streets should be provided a surface at least appropriate to be used in the future as subgrade for improved surfacing or paving.<sup>26</sup> Macadam or better should be required for use on streets to be used by vehicles or on streets with slopes of more than 12%.

Streets should be provided a system for the drainage of rainwater. A network of deep and shallow erosion-proof ditches and culverts should be the minimum supplied in any case.<sup>27</sup> But the particular conditions of each site should be studied to decide what is the most adequate and economical system that may be provided, because in some circumstances piping may be a better choice than ditches even at the minimum level of service.

### B.2.3 LAND SUBDIVISION

The aspects that will be covered here are important since the conditions established in terms of land utilization or circulation are reached through activities associated with land subdivision. Attention should be paid to the definition of some requirement in aspects of land subdivision because they are intimately related to investment costs in the execution of the settlement. The ways the land will be left to serve specific purposes are defined through the conditions defined in the subdivision of blocks and groups of lots in general; and in the subdivision of semiprivate and private lots in particular. Those are the issues that will be considered in this section.

#### Blocks and groups of lots

##### *Block dimensions*

To assure acceptable conditions of accessibility to any lot of a block, the size of the block has to be limited. Then, according to this criterion, the semiperimeter of a block, measured along the public streets serving as its boundaries, should never exceed 400 m, because that is the maximum distance that is considered acceptable for a person to walk to alternate points of access. And no side of a block should be shorter than 80 m nor longer than 200 m, because, in addition to the above-mentioned reason, shorter sides will be uneconomical, and longer sides will limit accessibility.

##### *Terraces in blocks and groups of blocks*

Depending on the way a street is serving an adjoining group of lots, it is acceptable to have certain differences of levels between that street and those lots to absorb irregularities in the topography of the site. However, those differences should never allow lines of circulation to drain onto a lot.

In some circumstances, as the irregularities of the topography cannot be absorbed by streets or other narrow elements alone, it may be necessary to look for another solution. Blocks and other large areas of land partially bounded by streets may have changes of levels within their boundaries by means of terraces intended to uphold lots or groups of

lots. However, if the plane of wall between two terraces is vertical, it should coincide with the lot boundary, so that no lot will contain a vertical terrace.

In any of those cases, nevertheless, adequate conditions should be defined to avoid landslides, erosion, or collapse of the wall or slant surface that connects the terraces or horizontal planes. In general, when those differences of levels are up to 1.25 m it is not necessary to take any measure nor give any protection; but when the difference is larger than that, there are two ways to solve the problem: to leave retaining walls or to leave stable slopes. And in each case, depending on the characteristics of the soil, the topography of the site, the economic conditions of the community, and the unit cost of the land, the kind of connection that will be used between terraces should be determined.

To achieve low costs in terracing and in the installation and maintenance of utility connections, when lots are opposite each other, with courts or streets in between, the lots should be placed in a regular pattern, so that their boundaries will align. Courts with streets in between should be placed similarly.

#### *Lot and court arrangements*

The reason for this disposition is that if those elements are opposite each other, utility connections may be made by using few fittings or accessories, and terraces may be built at lower costs because of their continuity and evenness.

#### Semiprivate and private lots

Size and other lot conditions should be defined as functions of the proposed uses of each lot or group of lots.

#### *Lot dimensions and conditions*

In relation to residential lots of one-family use, the requirements that must always be fulfilled must be established, because that is the only way to be sure that lots will not be provided with inadequate or with uninhabitable conditions. The definition of those requirements should be based on an evaluation of many factors related to health,

culture, economy, and other subjects.

One of the basic conditions considered an essential requirement is that every residential lot should have a flat area of a specific size suitable for the location of the dwelling. That area, which will be called the "basic lot area," has to be left in any case to be sure that the lot may begin to be used as soon as it is allocated. In this way the new settler may start construction of a shelter without having to flatten the lot.

To define the conditions that will characterize the basic lot area, it should be described as a rectangular surface of a specific area, with widths no shorter than a certain dimension and with accesses with a particular minimum clearance. The slope of the area should be between 1.5% and 5%, in the direction in which the lot will drain.

Subsequently, residential lots of the size of the basic lot area or larger may be provided as long as in both cases each lot will have a flat area equivalent to that of the basic one. And that means that in order to achieve low initial lot costs, lots within certain ranges of irregularity in topography may be provided.

However, in addition to the requirement for any residential lot to include the basic lot area, other essential conditions must be set. For instance, a minimum lot width and a minimum clearance in lot accesses should be defined, because if these dimensions are not fixed, lots may be useless or their uses may be limited. Besides, the slopes of the lots should be conditioned to drain onto the court (if that is the case), onto adjacent streets, or onto other public lines of drainage, but not onto private, semiprivate or semipublic areas.

In private lots of one-family residential use combined with other uses, dimensions and conditions should be provided to fulfill, in addition to the specified residential requirements, the demands of those extra purposes. Something similar will happen when the lots are for one-family resi-

dential use only but there is a particular need of additional area to complement that residential use: the lot area should be larger than the basic lot area.

Semiprivate noncourt lots should be conditioned in accordance with the particular circumstances of their uses.

Subdivision of private lots for one-family residential use and of lot courts once they have been authorized should be avoided. This measure is directed toward avoiding: 1) multiplication of lots, appearance of lots smaller than the basic lot area, and increments of population and density, which may mean harder living conditions for the inhabitants in general and curtailment of essential services; and, 2) subsequent loss of access or services in served private lots which depend on a court.

As a general attitude the definition of lot requirements should be seen as a flexible instrument that may be used not only to guarantee basic conditions on lots but as a way to identify the most economical and suitable choices in the process of land subdivision. All the conditions that have to be defined under this sections should have this focus and this flexibility.

### **B.3 The necessary complements**

All the norms that may be defined for the development of urban settlements have to be organized as a whole, in order to have a unity, and identity, a common focus. And in addition to that, their conditions have to be localized in a context.

The work, in consequence, has to define its scope--its purposes, the situations where it is going to be applied, the way as it is going to be enforced, and the interpretations that is given to the terms that serve to its formulation-- within a context.

As a matter of fact, the norms should be organized including

a complementary section dealing with aspects of scope and purposes, applicability, administration, and definitions.

#### Scope and purpose

Under these concepts it should be specified that the norms will cover aspects of land utilization, circulation, and land subdivision in the development of popular urban settlements in a particular place, which in this case is the republic of Guatemala. That is the scope of the work: to deal with those three subjects in that location.

The purposes to be defined for the work could be several; but in general it may be specified that the goal is the promotion of health, safety, convenience, welfare, and economy in the development of those settlements, in the interest of the benefit of their inhabitants.

As the work is based on land-utilization criteria, the ways to be chosen for achieving its purpose are closely related to those criteria. In fact, clear definition will be encouraged of the different utilizations that will be given to the land; and responsibilities and rights in relation to the different land utilizations will be defined. In order to assure adequate complementary conditions, provision of community services will be guaranteed and overcrowding will be avoided or prevented. And, in general, the most economical design, development, and use of those settlements will be encouraged based upon the resources and the economic situation of their inhabitants or possible inhabitants.

#### Applicability

The need for the formulation of these norms stems from the lack of regulations covering aspects of physical development in popular urban settlements. There are equivalent regulations directed to other levels of the population, but the majority lacks a guide or a legal guarantee to adequate conditions in their settlements.

A way to define the population to which these norms are addressed should be formulated. It is not enough to say

that they are directed to popular settlements. It is necessary to define the term "popular" for these purposes.

One alternative is to define the limits of applicability of the norms based on population incomes. And to avoid the problems related to fluctuations of the real currency value, the respective income levels may be redefined at regular intervals.

This last possibility may be achieved by fixing ranges of income. The lower limit of those ranges might correspond to the minimum monthly income per family sufficient to afford a private lot for one-family residential use complying with conditions specified in the norms. The upper limit could correspond to the minimum monthly income per family sufficient to afford a lot of the minimum level permitted by the respective regular municipal regulation or by-law or its equivalent. In this way, the norms would be addressed to the level of population that really needs them.

#### Administration

To enforce the norms a body that will have specific functions in matters of implementation, enforcement, monitoring, and interpretation will have to be defined.

The body might be in charge of the definition of the ranges of income related to the applicability of the norms, and it might define by itself the administrative proceedings for achieving its specific functions.

This body should be associated with BANVI, the National Bank for Housing of Guatemala, because BANVI is the institution most concerned with problems of popular housing and settlements in Guatemala. However, the body may be associated with another agency if there is a more suitable one in the institutional system of Guatemala.

This body may be in charge of approval of new popular settlement projects, of supervision of the allocation of those settlements, and of enforcement of the requirements speci-

fied in the norms for physical conditions of those settlements. It may be in charge also of keeping records of the settlements authorized under these norms, of applications for authorization of new projects, and of the people being allocated dwelling units in each settlement.

### Definitions

Finally, to avoid misinterpretations of the norms and of the terms used in them, their components should include a list of definitions with the meanings given to the key words and phrases employed. Those definitions should be listed in alphabetical order by term, so that they can be located easily.

The main terms that should be included here are those related to the concepts of land utilization in contrast to land use, so that readers will have a clear understanding of the criteria used to define the work.



## NOTES

- <sup>1</sup> Horacio Caminos and Reinhard Goethert, *Urbanization Primer* (Cambridge, Mass.: The M.I.T. Press, 1978), p. 6; hereafter cited as *Primer*.
- <sup>2</sup> United Nations, Department of Economic and Social Affairs, *Methods for Establishing Targets and Standards for Housing and Environmental Developments* (New York: UN, 1968), p. 9.
- <sup>3</sup> *Primer*, p. 83.
- <sup>4</sup> Guatemala, *Constitución de la República* (15 Sep. 1965); Art. 69.
- <sup>5</sup> The concept of "land utilization" has been developed by the Urban Settlement Design Program, at M.I.T. See *Primer*.
- <sup>6</sup> *Primer*, pp. 92-93.
- <sup>7</sup> *Primer*, pp. 92-93.
- <sup>8</sup> *Primer*, pp. 93-94.
- <sup>9</sup> *Primer*, p. 94.
- <sup>10</sup> *Primer*, p. 92.
- <sup>11</sup> *Primer*, p. 92.
- <sup>12</sup> The conditions specified here are based on Fernando Masaya Marotta, *Método de Estudio de Tierras y Cuadro Resumen de Diagnóstico* (Guatemala City: BANVI, Proyecto BANVI-BIRF, 1978).
- <sup>13</sup> *Primer*, pp. 62-65.
- <sup>14</sup> See p. 19 in this work.
- <sup>15</sup> *Primer*, p. 63.
- <sup>16</sup> *Primer*, p. 63.
- <sup>17</sup> *Primer*, p. 63.
- <sup>18</sup> These are basically the services that are being provided in Guatemala in popular urban settlements. See Banco Nacional de la Vivienda, Proyecto BANVI-BIRF, *Guía de Diseño para Asentamientos Humanos de Bajo Costo y Beneficio Social* (Guatemala City: BANVI, 1978).
- <sup>19</sup> *Primer*, pp. 118, 124 and 140.
- <sup>20</sup> *Primer*, pp. 86-87 and 134-36.
- <sup>21</sup> *Primer*, p. 88.
- <sup>22</sup> *Primer*, p. 86; and State of New Jersey, Dept. Comm. Affairs, Div. State and Reg. Plann., *Administrative Guide to Subdivision Regulations*, p. 21.
- <sup>23</sup> New Jersey, p. 20.
- <sup>24</sup> El Salvador, "De las urbanizaciones y fraccionamientos," in *Reglamento a la Ley de Urbanismo y Construcción*, Art. 43.
- <sup>25</sup> *Primer*, p. 134.
- <sup>26</sup> *Primer*, p. 134.
- <sup>27</sup> *Primer*, p. 88.

## ABBREVIATIONS

BANVI	Banco Nacional de la Vivienda, or National Bank for Housing of Guatemala
Ha	hectares
M.I.T.	Massachusetts Institute of Technology
m	meter
%	percent
SGCNPE	Secretaría General del Consejo Nacional de Planificación Económica, the body in charge of economic planning in Guatemala
sq m	square meters
UN	United Nations
USDP	Urban Settlement Design Program of the Massachusetts Institute of Technology

## EQUIVALENTS

### UNITS OF MEASUREMENT

#### LINEAR UNITS

1 centimeter	=0.3937 inches
1 meter =100 centimeters	=39.37 inches or 3.28 feet
1 kilometer =1,000 meters	=3,280.83 feet or 0.62 miles
1 inch	=2.54 centimeters
1 foot	=0.3048 meters
1 mile	=1.61 kilometers

#### SQUARE UNITS

1 square meter	=1,550 square inches or 10.76 square feet
1 hectare =10,000 sq m	=2.4711 acres
1 square foot	=0.0929 square meters
1 acre	=0.4087 hectares

# GLOSSARY

The criteria for the preparation of the definitions have been as follows:  
**FIRST PREFERENCE:** definitions from "Webster's Third New International Dictionary", Merriam-Webster, 1971.

**SECOND PREFERENCE:** definitions from technical dictionaries, textbooks, or reference manuals.

**THIRD PREFERENCE:** definitions from the Urban Settlement Design Program (USDP) Files and from the author. They are used when existing sources are not quite appropriate/satisfactory.

Words included for specificity and to focus on a particular context are given in parenthesis.

Sources of definitions are given in parenthesis. (See also Bibliography).

**ACCESS STREET.** See STREET.

**ACCESSES.** The pedestrian/vehicular linkages from/to (the site, a lot, or an area) to/from existing or planned approaches. (USDP)

**BASIC LOT AREA.** The minimum area to be provided in a private lot for one-family residential use. The basic lot area is a flat surface, with specified minimum dimensions and conditions. (Author)

**BASIC UNIT.** See SERVICE BASIC UNIT.

**BLOCK.** A portion of land bounded and served by lines of public streets. (USDP)

**BOUNDARY.** Something (a line or area) that fixes or indicates a limit or extent (of the site or lot). (Merriam-Webster, 1971)

**CIRCULATION.** Movement of pedestrians and vehicles within and among urbanized areas. Also the system serving for those purposes. (Author). See CIRCULATION NETWORK

**CIRCULATION NETWORK.** The system of spaces and lines used for the movement of pedestrians and vehicles within and among urbanized areas and serving as the base of the utilities networks and the drainage of storm water of those areas. This system involves, in the case of a settlement, the following components: external and linking streets, through streets, access streets, open spaces, and courts. (Author)

**CLUSTER.** See LOT CLUSTER.

**COMMUNITY.** The people living in a particular place or region and usually linked by common interests; the region itself; any population cluster. (USDP)

**COMMUNITY BUILDING.** Building for a community's social, cultural, recreational and civic activities. (Merriam-Webster, 1971)

**COMMUNITY CENTER.** A building or group of buildings constituting a focal point of (social, cultural,) educational and recreational activities and serving (the) whole community (of a settlement). (Merriam-Webster, 1971)

**COMMUNITY SERVICES.** Installations, buildings and areas administered to be used in common by the members of the community of a settlement. (Author)

**COSTS OF URBANIZATION.** Include the following: **CAPITAL:** cost of land and infrastructure; **OPERATING:** cost of administration, maintenance, etc.; **DIRECT:** include capital and operating costs; **INDIRECT:** include environmental and personal effects. (USDP)

**COURT.** See LOT COURT.

**CULVERT.** A transverse drain or waterway, (usually piped) as under a road, railroad, or canal. (Merriam-Webster, 1971)

**DEAD END.** A public street with no exit or continuation. (Author)

**DENSITY.** See GROSS DENSITY and NET DENSITY.

**DESIGN.** 1) The arrangement of elements that make up a work of art, a machine or other manmade object.

2) The process of selecting the means and contriving the elements, steps, and procedures for producing what will adequately satisfy some need. (Merriam-Webster, 1971)

**DEVELOP A SETTLEMENT, TO.** To transform a site or a settlement to satisfy the needs of the community that will be living there or that is already living there. (Author)

**DEVELOPER.** A person who is in charge of the development of a settlement or of the development of a section or element of it. (Author)

**DEVELOPMENT MODE.** Two modes are considered: **PROGRESSIVE:** the construction of the dwelling and the development of the local infrastructure to modern standards by stages, often starting with provisional structures and underdeveloped land. This essentially traditional procedure is generally practiced by squatters with de facto security of tenure and an adequate building site. **INSTANT:** the formal development procedure in which all structures and services are completed before occupation. (USDP)

**DISTANCE.** The degree or amount of separation between two points (the site and another thing, or two areas of the site,) measured along the shortest path joining them (and in general along public streets). (Merriam-Webster, 1971)

**DRAINAGE.** Interception and removal of groundwater or surface water, by artificial or natural means. (De Pina, 1972)

**DUST/DIRT.** Fine dry pulverized particles of earth, grit, refuse, waste, litter, etc. (Merriam-Webster, 1971)

**DWELLING.** The general, global designation of a building/shelter in which people live. A dwelling contains one or more "dwelling units". (USDP)

**DWELLING UNIT.** A self-contained unit in a dwelling for an individual, a family, or a group. (USDP)

**EASEMENT.** Servitude: a right in

respect of an object (as land owned by one person) in virtue of which the object (land) is subject to a specified use or enjoyment by another person or for the benefit of another thing. (Merriam-Webster, 1971)

**EFFICIENCY.** Capacity to produce desired results with a minimum expenditure of energy, time, money or materials. (Merriam-Webster, 1971)

**EROSION.** The general process whereby materials of the earth's crust are worn away and removed by natural agencies including weathering, solution, corrosion, and transportation; specifically land destruction and simultaneous removal of particles (as of soil) by running water, waves and currents, moving ice, or wind. (Merriam-Webster, 1971)

**EXISTING STRUCTURE.** Something constructed or built (on the site). (USDP)

**EXTERNAL STREET.** See STREET.

**FLOODING.** A rising and overflowing of a body of water that covers land not usually under water. (USDP)

**GOVERNMENT/MUNICIPAL REGULATIONS.** In urban areas, the development of the physical environment is a process usually controlled by a government/municipality through all or some of the following regulations: master plan, zoning ordinance, subdivision regulations, building code; (or their equivalents). (USDP)

**GROSS DENSITY.** a) Population Gross Density (PGD): the ratio of the total population of a settlement (P) to the total usable area of its site (UA); then,  $PGD = P/UA$ . b) Lot Gross Density (LGD): the ratio of the total number of lots of a settlement (L) to the total usable area of its site (UA); then,  $LGD = L/UA$ . (Author)

**HEALTH CENTER.** A building/installation where professional health care is provided by licensed physicians, all general practitioners and not specialists. Health centers may be with or without beds according to the population to be served. (Author)

thor)

**ILLEGAL.** That which is contrary to or violating a rule or regulation or something having the force of law. (Merriam-Webster, 1971)

**INCOME.** The amount (measured in money) of gains from capital or labor. (USDP)

**INCOME GROUPS.** A group of people or families within the same range of incomes. (USDP)

**INDUSTRIES.** See **LIGHT INDUSTRIES.**

**INFRASTRUCTURE.** The underlying foundation or basic framework for utilities and services: streets, sewage; water network; storm drainage, electrical network; telephone network; public transportation; police and fire protection; refuse collection, health, schools, playgrounds, parks, open spaces. (USDP)

**LAND DEVELOPMENT COSTS.** The costs of making raw land ready for development through the provision of utilities, services, accesses, etc. (USDP)

**LAND SUBDIVISION.** The dividing of a site or a part of a site into different areas or sections that will have specific sizes and conditions according to a predetermined land utilization plan, scheme, or conception. (Author)

**LAND USE.** The giving of a purpose to an area of a site based on the kind of activities for which the area is going to serve. (Author)

**LAND UTILIZATION.** The giving of a purpose to an area or section of the site based on: the individual or shared or community character of its use; the designation of its responsible agent; and the relationship of the land with other sections of the settlement or urban area in serving them or being served by them. (USDP, Author)

**LAYOUT.** The plan or design or arrangement of something that is laid out. (Merriam-Webster, 1971)

**LEVELS OF SERVICE.** Two levels are considered: *MINIMUM*, acceptable levels that may be fixed as a be-

ginning or base for later development, and *STANDARD*, levels set up to define the desirable minimum to be achieved after a development process has been carried out. (Author)

**LIGHT INDUSTRIES.** Industries that are compatible with residential use. Light industries shall be classified in two types: type A, those that may be located anywhere in the site, even within residential areas; and, type B, industries that must be located some distance from residential areas and community buildings. (Author)

**LINE OF CIRCULATION.** The linear components of the circulation network, and basically the streets of that system. The "basic" lines of circulation within a settlement are, in general, its through streets. (Author)

**LINE OF UTILITIES.** The main linear elements of the utilities networks. The "basic" lines of utilities are the most important lines of a specific network; in general, they include those that serve whole urban areas or large sections of a settlement, the "first-order lines," and those that serve small sections of a settlement, the "second-order lines." The nonbasic lines are those that serve lots in a direct and individual way, the "service connections." (Author)

**LINKING STREET.** See **STREET.**

**LOCALITY.** A relatively self-contained residential area/community/neighborhood/settlement within an urban area which may contain one or more dwelling/land systems. (USDP)

**LOCATION.** Situation: the way in which something (the site) is placed in relation to its surroundings (the urban context). (Merriam-Webster, 1971)

**LOT.** A measured area of land in a site, having fixed boundaries, a specified utilization (present or projected), and access to public streets. (Author)

**LOT CLUSTER.** The whole of a court and the group of lots having access through it. (USDP, Author)

**LOT COURT.** Semiprivate lot used as an area for access to private lots and as the supporting land to place the infrastructure of the utilities serving those lots. A court serving only private lots for residential use is called "residential court." (USDP, Author)

**MARKETPLACE.** An area where food, clothing and household items are sold to the public. It is commonly provided a building, placed on semipublic land. (Author)

**NEIGHBORHOOD.** A section lived in by neighbors and having distinguishing characteristics. (USDP)

**NET DENSITY.** a) Population Net Density (PND): the ratio of the total population of a settlement (P) to the total area destined to semiprivate and private utilizations (SPvA+PvA); then,  $PND = P / (SPvA + PvA)$ . b) Lot Net Density (LND): the ratio of the total number of lots of a settlement (L) to the total area destined to semiprivate and private utilizations (SPvA+PvA); then,  $LND = L / (SPvA + PvA)$ . (Author)

**NORMS.** Measures of levels of acceptability, at a given time and place and in a given set of cultural, technological, and economic conditions, (proposed according to specific objectives or targets). (UN, Methods, 1968)

**PLANNING.** The establishment of goals, policies, and procedures for a social or economic unit, i.e. city. (USDP)

**POPULATION DENSITY.** See **GROSS DENSITY** and **NET DENSITY.**

**PRIVATE LAND.** Land for individual use by a person (family). It is the responsibility of the user and is served by other sections of the settlement or urban area (access, services and utilities). It has varied uses: residential, commercial, and others. (USDP, Author)

**PROJECT.** A plan undertaken; a specific plan or design. (USDP)

**PUBLIC LAND.** Land for open use by anyone. It is the responsibility of the public sector and is intended to serve all the sections of the

settlement or urban area. Its use is essentially for unrestricted circulation of pedestrian and vehicles. It commonly is comprised of streets, walkways, open spaces. (USDP, Author)

**RECREATION AREAS.** Spaces provided to a community for recreation and amusement. (Author)

**RESERVED AREAS.** Areas or sections of the site to be kept to be subdivided and utilized after the initial occupation of the settlement. (Author)

**RESIDENTIAL AREA.** An area containing the basic needs/requirements for daily life activities: housing, education, recreation, shopping, work. (USDP)

**RESPONSIBLE AGENT.** The person in charge of maintaining an area or section of the site or the settlement. It is he or she who pays any taxes applied on that land. (Author)

**RIGHT-OF-WAY.** A legal right of passage over another person's ground (land), the area or way over which a right-of-way exists such as: a path or thoroughfare which one may lawfully use, the strip of land devoted to or over which is built a public road, the land occupied by a railroad, the land used by a public utility. Rights-of-way may be shared (as streets: pedestrians and automobiles) or exclusive (as rapid transit routes; subways, railroads, etc.). (Merriam-Webster, 1971; USDP)

**SANITARY SEWERAGE.** The system of artificial, usually subterranean, conduits to carry off sewage composed of: *excreta*: waste matter eliminated from the human body; *domestic wastes*: used water from a home/community containing 0.1% total solids; and some *industrial waste*, but not water from ground, surface, or storm. (USDP)

**SCHOOL.** An organized institution of education for different age groups as follows: preprimary school (kindergarten), ages 2-7; primary school, ages 7-14; secondary school, ages 12-18; colleges and universities, ages 17 and above. (USDP, Author)

**SEMIPRIVATE LAND.** Land for shared use by a group of persons. It is the responsibility of that group and is served by other sections of the settlement or urban area (access, services and utilities). It is used for different activities and basically complements residential use. Some of its common uses are restricted circulation and recreation. (USDP, Author)

**SEMIPUBLIC LAND.** Land for open use by the members of the community of a settlement or urban area. It is the responsibility of the public sector and/or the community itself and is intended to offer services to other sections of the settlement or urban area. It is used for the provision of community services and utilities. (USDP, Author)

**SERVED LAND.** Usable land served by public and semipublic land and therefore possibly taxable. It includes land with private and semiprivate utilizations. The term "served areas" refers in a specific way to particular areas of served land. (Author)

**SERVICE BASIC UNIT.** An installation, building, or area that has the minimum conditions to provide a specific community service completely, efficiently, and economically. (Author)

**SERVITUDE.** See **EASEMENT.**

**SETTLEMENT.** The location where a group of families establishes its residence by a process of development and transformation of a site. (Author)

**SEWERAGE.** Sewerage system: the system of sewers in a city, town or locality. (Merriam-Webster, 1971)

**SITE.** A portion of land that is or could be suitable to the establishment of a settlement. (Author)

**STORM DRAINAGE.** Storm sewer: a sewer (system) designed to carry water wastes except sewage (exclusively storm water, surface runoff, or street wash). (Merriam-Webster, 1971)

**STREET.** A longitudinal public area connected to other similar area or areas, which provides access to lots and sections of a settlement or urban area. There are four basic types of streets in relation to a settlement: a) *external streets*: streets adjoining the site and serving the area where the settlement is located. They are on public land but are not part of the settlement or the site. b) *linking streets*: streets connecting the site to the national or municipal circulation network of the area where the settlement is located. They are intended to serve only the settlement but are not considered a part of the site. Linking streets are on public land. c) *through streets*: the main streets of the settlement itself, serving to interconnect the different areas or sections of it directly and continuously and to uphold its basic lines of utilities. The connections of external and linking streets with the interior of the settlement are basically by means of through streets. Through streets are on public land. d) *access streets*: streets serving to interconnect through street or to connect through streets to specific areas of the settlement in order to provide access and alternate lines of circulation. They also are on public land. (Author)

**STREET LIGHTING.** Illumination to improve vision at night for security and for the extension of activities. (USDP)

**TELEPHONE.** An electrical voice communication network interconnecting all subscribing individuals and transmitting over wires or by other electronic means. (USDP)

**THROUGH STREET.** See **STREET.**

**TOPOGRAPHY.** The configuration of a (land) surface including its relief and the position of its natural and manmade features. (Merriam-Webster, 1971)

**TRANSPORTATION.** Means of conveyance or travel from one place (the site) to another (other parts of the urban context). (Merriam-Webster, 1971)

**URBAN.** Of, relating to, characteristic of, or taking place in a city. Constituting or including and centered in a city. (Merriam-Webster, 1971)

**URBANIZATION.** The quality or state of being or becoming urbanized; to cause to take on urban characteristics. (USDP)

**USABLE AREA.** The part of the site suitable for specific uses within the settlement and developed as part of the settlement. Usable area can be controlled and its limits identified, and it has, or could be provided, access and the necessary utilities. (Author)

**UTILITIES.** Services provided or supplied by means of the basic infrastructure and networks of a settlement. They include (without being limited to) the following: water supply, sanitary sewerage, storm drainage, electricity, street lighting, and telephone. (Author)

**UTILITY CONNECTION (ELECTRICITY) OR SERVICE DROP.** The electrical connection between the secondary low-tension network and the electrical system of the individual lot or cluster of lots. (USDP, Author)

**UTILITY CONNECTION (SEWAGE).** The pipes and fittings that connect the individual lots, cluster of lots, or community sewage systems with the basic network. (USDP, Author)

**UTILITY CONNECTION (WATER).** The pipe and fittings that connect the street distribution pipe to the plumbing system or storage tank of an individual lot or cluster of lots. (USDP, Author)

**WATER SUPPLY.** Source, means, or process of supplying water, (as for a community) usually involving reservoirs, pipelines, and often the watershed from which the water is ultimately drawn. (Merriam-Webster, 1971)

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